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Macroscopic effects on neutralino dark matter depletion through large R-charge

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The presence of a large, non-vanishing background charge in the universe can interestingly have implications on symmetry restoration at high temperature. In theories with continuous global symmetries, like the R-symmetry of the MSSM, these can lead to important cosmological effects seemingly independent of the short-distance scale physics. Here we explore the effect of temporary R-symmetry violation on the density of neutralino dark matter in the presence of a large initial R-charge in the early universe. In particular, this behaviour may be important for models in which the dark matter experiences feeble annihilation rates with the primordial plasma, common in supersymmetric models.

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